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(54) Abstract Title: **Display Device For Gaming Machines**

- (57) A gaming machine reel 16 is provided with a display device comprising a flexible strip 20 of electronically programmable display material secured around the periphery of the reel. Symbols 25 may be selectively displayed on the material by appropriate programming thereof, for example by providing a plurality of addressable pixels on the material each of which may be driven to have a suitable translucence and to display a required colour. Discrete areas of the LCD displaying symbol images may use a large number of small pixels, whereas other areas displaying only uniform colour may use a fewer number of larger pixels. A rechargeable power source 26 is provided on the reel. The programming of the strip may be affected by a wireless link comprising a transmitter 29 on the reel frame and a receiver on the reel, using either an RF or an infra-red link.

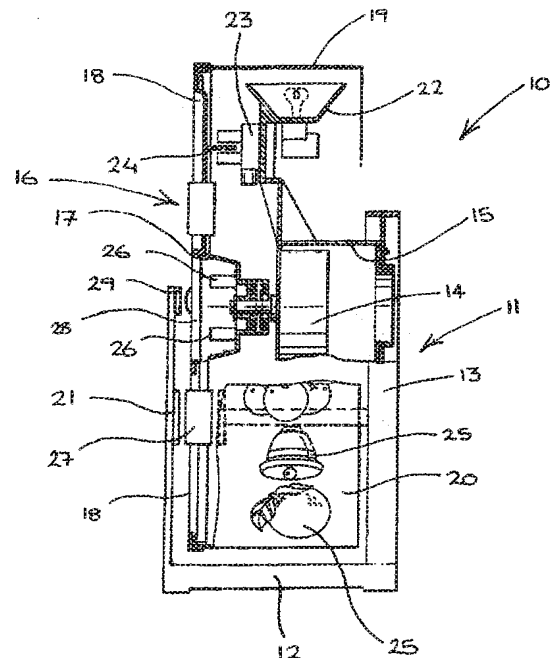


Figure 2

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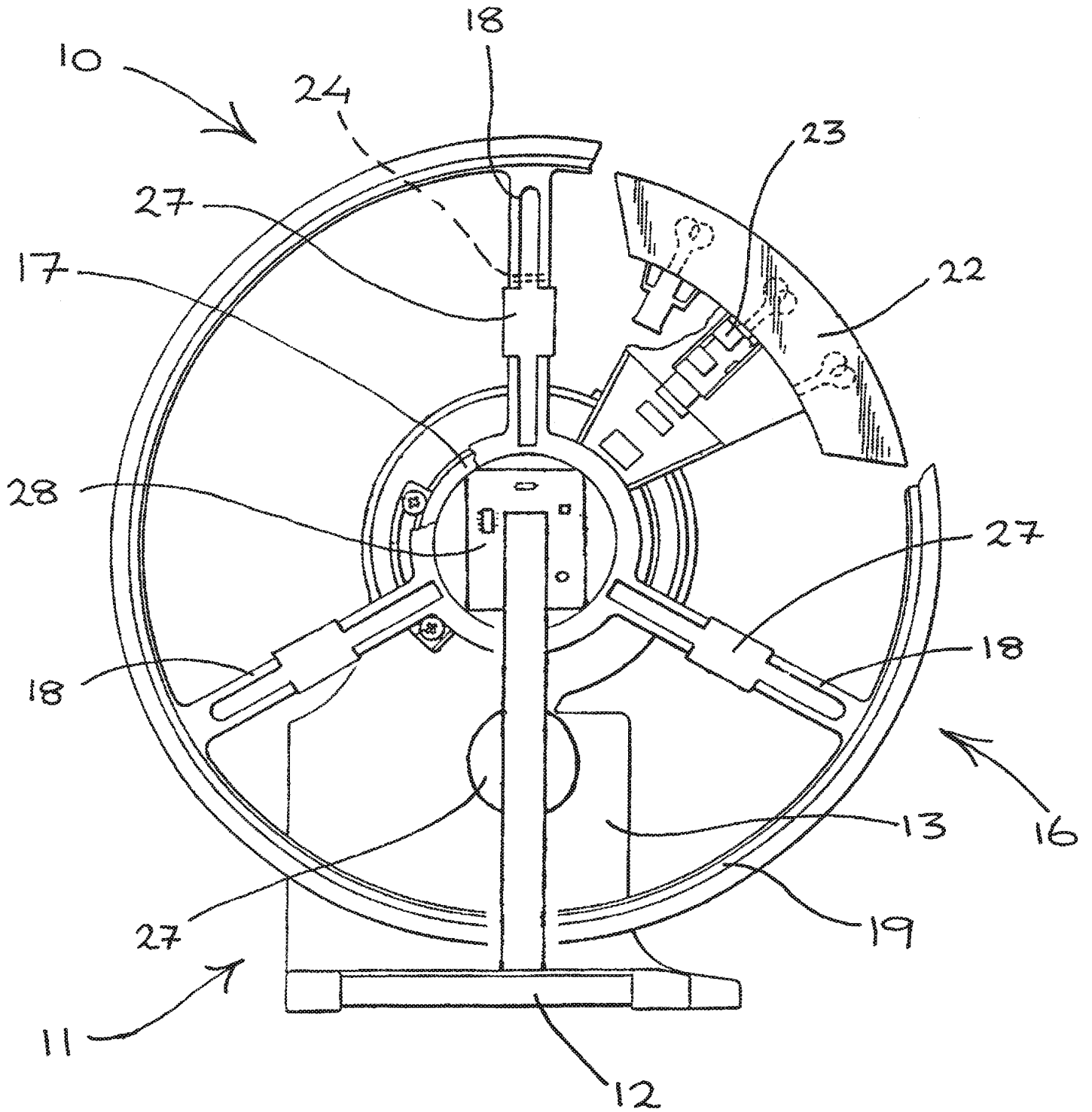


Figure 1

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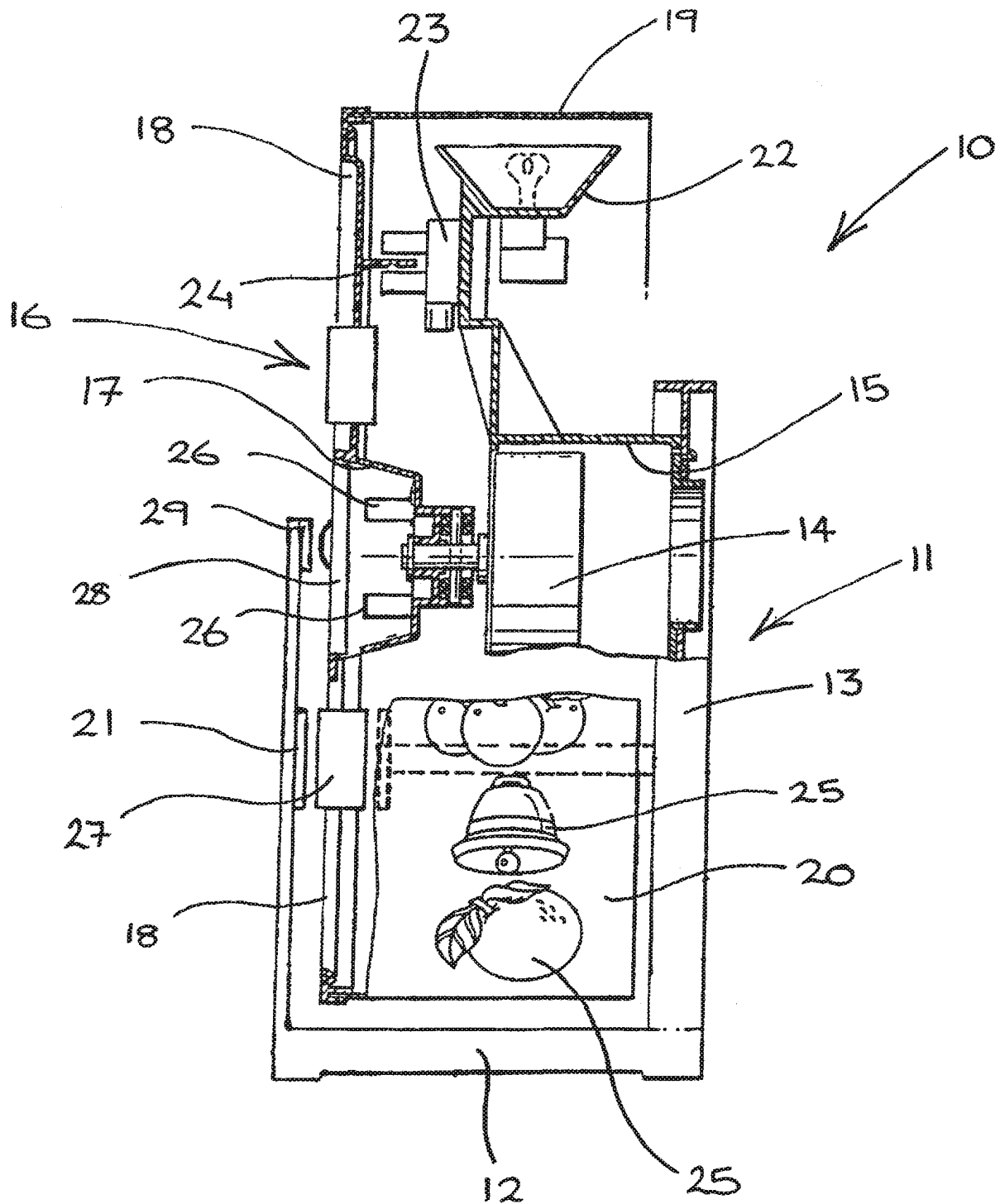


Figure 2

DISPLAY DEVICE FOR GAMING MACHINES

This invention relates to a display device suitable for use in conjunction with a reel of a gaming machine, which is sometimes referred to as a fruit machine or an amusement machine. The invention further relates to the combination of such a display device and a gaming machine reel, and to a
5 method of displaying symbols on such a reel.

Many gaming machines include a plurality of juxtaposed reel mechanisms each comprising a rotatably mounted reel having a cylindrical peripheral surface with symbols marked thereon, such as of pieces of fruit or other indicia. The mechanism includes a motor arranged to rotate the reel
10 rapidly, as well as a light source to direct light radially outwardly through the peripheral surface of the reel in the region of a window provided on the front panel of the gaming machine, and a further arrangement to detect the position of the reel. In operation, the reels are caused to spin about a common axis by pulling a handle or pressing a button. When the reels come to rest, the
15 positions of the symbols on the reels in relation to one or more pre-determined lines determine whether or not a player has won a prize.

The reel generally is in the form of a frame around the periphery of which a flexible reel strip is mounted, the reel strip carrying the required symbols. Typically, the reel strip is formed of a translucent plastics material on which the
20 required symbols are printed or otherwise provided thereon, so that the symbols may be illuminated by the light source and viewed through one or more windows in the front panel of the gaming machine.

The basic construction of the reel mechanisms incorporated within a gaming machine is well known in the art and will not be described in further detail here.

A problem associated with a conventional reel mechanism is that the reel strip is pre-printed and installed in the gaming machine at the time of manufacture; the reel strip is thus intended for a particular game loaded into the machine. If the machine is subsequently to be used for a different game, the reel mechanisms must be removed from the gaming machine so that the reel strips may be removed from all of the reel mechanisms and then replaced by fresh strips carrying different symbols, suitable for use with a different game. This requires attendance by a maintenance engineer and consequently once a gaming machine has been installed at a particular site, it is in general quite expensive subsequently to upgrade the machine for playing a different game.

This invention aims at overcoming the above-described problem associated with conventional reel mechanisms. Accordingly, one aspect of this invention provides a display device suitable for use in conjunction with a reel mechanism of a gaming machine, which device comprises a flexible strip of electronically programmable display material, means to mount said strip around the periphery of a reel, and communication means adapted to provide drive signals to a strip supported on a reel, whereby selected symbols may be displayed at chosen positions on a reel supporting said flexible strip.

It will be appreciated that with the display device of this invention, the symbols displayed around the periphery of the reel of a reel mechanism will depend upon the programming associated with the strip. For example, a

computer may run a program which specifies the configuration of each symbol and the location of each symbol along the length of the strip, the computer then generating the required drive signals for the strip and which are transferred thereto by the communication means. so that the required symbols are
5 displayed around the periphery of the reel. If different symbols are required, or the symbols are to appear in different relative positions, either to modify a game being played or for the playing of a different game, it is merely a matter of changing the programming associated with the strip. It thus becomes practical for the loading of a new game into a gaming machine, merely by changing the
10 program of a processing unit incorporated within the gaming machine.

Most preferably, the flexible strip comprises a strip of flexible LCD (liquid crystal display) material, advantageously defining a large number of individual pixels each of which may separately be addressed in order to allow the display of a chosen colour. In this way, appropriate drive signals applied to the flexible
15 strip will allow the display of a plurality of separate symbols spaced along the length of the strip. Further, the background surrounding each of the symbols may also be caused to display one or more colours, so that the symbols may stand out from that background.

In order to reduce the total number of pixels on the strip of flexible LCD
20 material, it would be possible to divide the strip into a number of discrete areas each of which may have a plurality of separately addressable pixels whereby a chosen symbol may be displayed in each of those areas, with the parts of the strip external to those discrete areas being pre-coloured or perhaps having

relatively few pixels each of a relatively large size, so as thereby to reduce the addressing requirements of the strip of LCD material

Other materials besides true LCD materials may be employed, so long as those other materials have the same or equivalent functionality.

5 There are several different ways in which this invention may be implemented. The flexible strip requires an electrical power source in order to allow adjustment of the states of the pixels of the strip, and also drive signals which address each pixel of the strip. This could be achieved by way of a rotary connector allowing the transfer of power and drive signals, with one part
10 of the connector mounted on a static part of the gaming machine and the other part of the connector centrally on the reel. The connector would require at least two separate conductors, by superimposing a multiplexed drive signal on a DC power signal. However, a reliable rotary connector could be difficult to implement and so it is preferred for the communication means to take
15 alternative forms.

In one embodiment, a rechargeable power source is incorporated within the hub of a reel, in a balanced manner – for example, by providing two, three or more cells in a symmetrical arrangement about the axis of rotation of the reel. These rechargeable power sources may be charged by an induction
20 charger which could either operate continuously, or when the reel is not rotating. In the latter case, a signal indicative of reel rotation may be used to switch off and on an induction charger, whereby charging will take place whenever the reel is stationary. Another possibility would be to incorporate a coil in the reel and to provide a magnetic field externally of the reel which field is

cut by the coil on rotation of the reel, whereby current is produced by the coil which may be used to drive the display device. Again, a rechargeable power source should be included in the reel, in order to allow for power to be supplied when the reel is not rotating.

5 The communication means may include a radio link or an infra red link, between a transmitter provided within the gaming machine and a receiver mounted on the reel. In this way, signals may be transferred to the reel either just while the reel is stationary or continuously, as required.

 The reel itself may include a memory device whereby signals transferred
10 to the reel by the communication means may be stored in that memory device. In this way, a particular reel strip configuration may be pre-loaded into the memory device by the communication means when a game is loaded into the gaming machine, the reel strip thereafter displaying the symbols and relative dispositions pre-loaded into the memory device. In this case, a rotary
15 connector may be provided for the supply of power to a battery on the reel, or an induction charging arrangement may be provided as described above.

 According to another but closely related aspect of this invention, there is provided a method of displaying pre-selected symbols at chosen locations on the reel of a gaming machine comprising furnishing a flexible strip of
20 electronically programmable display material around the periphery of the reel, providing a control circuit on the reel for supplying drive signals to the flexible strip, providing a power source on the reel for powering the control circuit and flexible strip and programming into the control circuit a control program which drives the flexible strip to display the selected symbols at the chosen locations.

By way of example only, one specific embodiment of reel mechanism including a display device of this invention will now be described in detail, reference being made to the accompanying drawings in which:-

Figure 1 is a side view on the reel mechanism and illustrating the
5 important components thereof; and

Figure 2 is an edge view on the reel mechanism of Figure 1.

In the drawings, there is shown a reel mechanism 10 comprising a base 11 having a foot 12 from which upstands a support 13. An electric motor 14 is mounted in a recess 15 provided at the upper end of the support 13, a reel 16
10 being clamped to the motor shaft such that the reel is rotated on drive current being supplied to the motor 14. The reel comprises a hub 17 from which three arms 18 extend radially, disposed at 120° to each other. The arms carry a lattice-like peripheral structure 19 around which a reel strip 20 is secured. The ends of the reel strip are adapted for clamping to a cross-member of the
15 peripheral structure 19 in such a way that the strip may be tensioned around the periphery of that structure. The ends of the strip may be reinforced to allow for this.

A lamp housing 22 is mounted on the support 13 and in this embodiment has three lamps provided adjacent the structure 19, to direct light radially
20 outwardly through the reel strip 20. A slot switch 23 is carried on the lamp housing 22 and co-operates with a blade 24 provided on one arm 18, in order to provide a reference position for the reel.

The construction of reel mechanism as described above is essentially conventional and will not be described in further detail here.

In this embodiment of the invention, the reel strip 20 is formed of a flexible plastics LCD material defining a large number of pixels each of which may individually be addressed in order to be of a chosen colour and translucence. In this way, individual symbols such as are shown at 25 may be
5 programmed to appear in a required location and with appropriate colouring, along the length of the reel strip and thus around the periphery of the reel. As with a conventional reel strip, the ends of the strip of flexible plastics LCD material may be reinforced in order to allow clamping of the ends of the strip to a cross-member of the peripheral structure 19 of the reel.

10 Incorporated within the hub 17 of the reel 16 is a rechargeable battery comprising three cells 26 disposed in a symmetrical manner about the axis of the reel so as not to affect the balance of the reel. Part way along the length of each arm 18 is an elongate wire coil 27 which interacts with a static magnetic field provided by an electromagnet 21 supported on the base 11. A charging
15 circuit is disposed within the hub 17 and is connected to the coils, such that charging current for the cells 26 is provided whenever the reel rotates.

Also provided within the hub is a control circuit 28 including a memory device and an infra red receiver, co-operable with an infra red transmitter 29 supported on the base 11. The transmitter 29 is connected to a processing unit
20 (not shown) provided as a part of the gaming machine within which the reel mechanism is incorporated, whereby the transmitter is supplied with signals for transmission to the control circuit of the reel. Those signals include information concerning the particular symbols to be displayed on the reel, the relative

positions of those symbols and the configuration in terms of the colour and translucence of those symbols.

In use, the reel mechanism is mounted within a gaming machine such that the lamp housing 22 is opposed to a window in a front panel of the gaming machine, so that the symbols for the time being lying between the lamp housing and the window may be viewed by a player. The symbols are pre-programmed into the reel memory and will remain constant for the duration of the game. However, it would be possible to allow dynamic re-configuration of the reel strip whereby the symbols displayed are changed in the course of the game.

It would also be possible to pre-program into the reel memory a plurality of different combinations of symbols or different symbols such that a chosen set of symbols may be displayed. In this way, following programming of the memory, a chosen set may be displayed by a relatively simple signal sent to the reel memory. If a new game not pre-programmed into the memory is to be played, then a more complex signal may be sent to the control circuit, defining the symbols and relative dispositions of those for this game.

CLAIMS

1. A display device suitable for use in conjunction with a reel mechanism of a gaming machine, which device comprises a flexible strip of electronically programmable display material, means to mount said strip around the periphery of a reel, and communication means adapted to provide drive signals to a strip
5 supported on a reel, whereby selected symbols may be displayed at chosen positions on a reel supporting said flexible strip.
2. A display device as claimed in claim 1, wherein the flexible strip comprises a strip of flexible liquid crystal display (LCD) material.
3. A display device as claimed in claim 2, wherein the strip of flexible LCD
10 material defines a large number of individual pixels each of which is separately addressable in order to allow the display of a chosen colour and to have a chosen translucence.
4. A display device as claimed in claim 2 or claim 3, wherein the strip of flexible LCD material is divided into a number of discrete areas each of which
15 has a plurality of separately addressable pixels whereby a chosen symbol may be displayed in each of those areas.
5. A display device as claimed in claim 4, wherein the parts of the strip external to said discrete areas are pre-coloured.
6. A display device as claimed in claim 4, wherein the parts of the strip
20 external to said discrete areas have relatively few pixels each of a relatively large size whereby the colour and translucence of said parts of the strip may be uniformly coloured so reducing the addressing requirements of the strip of LCD material.

7. A display device as claimed in any of the preceding claims, wherein the ends of the strip are arranged for clamping to a reel of a reel mechanism with which the display device is associated, such that the strip is curved around a cylindrical surface of the reel.
- 5 8. A display device as claimed in any of the preceding claims, wherein the communication means includes a rotary connector adapted to allow the transfer of power and drive signals to a reel with which the display device is associated, with one part of the connector mounted on a static part of a gaming machine and the other part of the connector disposed centrally on the reel.
- 10 9. A display device as claimed in claim 8, wherein the connector has at least two separate conductors for carrying an electrical signal comprising a multiplexed drive signal superimposed on a DC power signal.
10. A display device as claimed in any of claims 1 to 7, wherein the communication means comprises one of a radio link and an infra red link,
15 between a transmitter provided within a gaming machine a receiver mounted on a reel with which the display device is associated.
11. A display device as claimed in any of the preceding claims in combination with a reel including a hub which supports a peripheral structure, the display device being secured to the peripheral structure for rotation with the
20 reel.
12. The combination of claim 11 and including a rechargeable power source incorporated within the hub of a reel, in a balanced manner.
13. The combination of claim 12, wherein an induction charger is provided for supplying current to the rechargeable power source, the induction charger

including an electrical coil provided on the reel and a static magnetic field cut by the coil on rotation of the reel

14. The combination of any of claims 11 to 13, wherein the communication means comprises one of a radio link and an infra red link, between a transmitter
5 provided on a static part of a gaming machine with which the reel is associated, and a receiver mounted on the reel.

15 The combination of any of claims 11 to 14, wherein the reel includes a control circuit, to control the supply of power and drive signals to the flexible strip of display material

10 16 The combination of claim 15, wherein the control circuit includes a memory device into which at least one strip configuration is programmed whereby in use the strip displays chosen symbols at the required relative dispositions.

17. A gaming machine whenever incorporating the combination of a display
15 device and a reel according to any of claims 11 to 16.

18. A method of displaying pre-selected symbols at chosen locations on the reel of a gaming machine comprising furnishing a flexible strip of electronically programmable display material around the periphery of the reel, providing a control circuit on the reel for supplying drive signals to the flexible strip,
20 providing a power source on the reel for powering the control circuit and flexible strip and programming into the control circuit a control program which drives the flexible strip to display the selected symbols at the chosen locations.

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Examiner: Mr David McWhirter

Claims searched: 1-18

Date of search: 30 April 2008

Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-8, 11, 15, 17 & 18	US 2003/060269 A1 (PAULSEN ET AL.) see whole document
X	1-8, 11, 15, 17 & 18	WO 2006/053139 A1 (MULTIMEDIA GAMES) see whole document
X	1, 3-8, 11, 15, 17 & 18	EP 1492063 A2 (ATRONIC) see whole document
X	1, 3-8, 11, 15, 17 & 18	JP 2003126328 A (CTC) see abstract and figures

Categories:

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Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	I	Patent document published on or after, but with priority date earlier than, the filing date of this application

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X:

Worldwide search of patent documents classified in the following areas of the IPC:

G07F

The following online and other databases have been used in the preparation of this search report

EPODOC, WPI

International Classification:

Subclass	Subgroup	Valid From
None		

